Mtn pine beetle 411

McCALL MOUNTAIN PINE BEETLE CONTROL PROJECT REPORT

STATE OF IDAHO
DEPARTMENT OF FORESTRY

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IDAHO STATE FORESTRY DEPARTMENT
SOUTHWEST IDAHO AREA

McCALL MOUNTAIN PINE BEETLE CONTROL PROJECT

The infestation of mountain pine beetle (Dendroctonous monticolae Hopk.), located generally between McCall and Cascade, Idaho, was first formally reported in 1961 by the U. S. Forest Service survey. The survey showed the infestation to be epidemic in nature with approximately 5,000 trees infested. No positive control action was taken at that time for the following reasons:

1. Lack of funds.
2. Difficulty of operating on private lands.
3. Low value of the timber being destroyed.

State and U. S. Forest Service personnel decided in early 1962 that a re-evaluation study should be made in 1962. A meeting of the affected landowners was held so as to keep them abreast of the situation. This meeting was held in late spring as part of the State Woodland Forestry program.

In August 1962, the U. S. Forest Service made an aerial survey of the infested area followed by ground checks. The average attack ratio for the entire area appeared to be about one new tree for each old tree with some areas as high as three to one. The survey indicated approximately 12,000 to 15,000 lodgeple pine infested during the 1961 flight period in the area between McCall and Cascade. Egg and larval densities indicated an epidemic infestation.

Control measures were recommended by the survey team with the first step of control to be a pre-control survey. It was noted in the survey report that requests for Federal aid for a control project would have to be submitted to Washington, D. C., by U. S. Forest Service Region IV, prior to November 1, 1962.

The area was inspected in September, 1962 by Gary Tucker of the State Forestry Department and Al Dahlgren of the Payette National Forest. Infested stands were typed on aerial photos and recommendations were made for an intensive survey and evaluation of the infested area.

The pre-control survey under the direction of Galen Trostle, of the U. S. Forest Service was initiated jointly by Federal, State, and private agencies in October, 1962. The purpose of the survey was to determine the number of infested trees and the approximate area involved. The survey consisted of 1/4 chain wide linear samples spaced at 5 chain intervals. Wet weather and shortage of manpower made it necessary to discontinue the sampling in favor of meander strips and off-hand estimates of the number of trees infested per acre to meet the November 1 deadline. The location and mapping of infested areas was facilitated by two short aerial surveys by Gary Tucker of the Idaho State Forestry Department, and by the use of aerial photos borrowed from the Valley County ASC Office. The final compilation of survey data was completed by the U. S. Forest Service and the Idaho State Forestry Department.

The actual cost of the survey is difficult to compute because of the

different agencies involved. Following is an approximate summary of mandays contributed by each cooperating agency and the findings of the survey:

Agency	Mandays
Federal (Payette National Forest)	10
Federal (Region IV)	8
State	20
Boise Cascade Corporation	3
Brown Tie & Lumber Company	3
Other Private	0

Estimated acres infested	5,860
Estimated trees infested	21,000

The decision to control the infestation was given impetus by the threat to the extremely valuable timbered recreation areas around Payette and Cascade Lake, and the possibility of spread to valuable stands of young ponderosa pine west of the infestation.

State Forester Roger Guernsey, presented the case to the Intermountain Pest Action Council at its November meeting. The Council recommended that control action be taken as soon as possible and recommended the use of the Forest Insect and Pest Control Fund. The proposed control project was then presented to the Cooperative Board of Forestry. The project and the use of the Pest Control Fund (38-408 ICA) was approved by the Cooperative Board of Forestry late in November. This special fund is maintained at $100,000 from money diverted from slash disposal contributions of private operators.

The cost of the project was to be shared by the U. S. Forest Service, private industry and the State of Idaho. The Federal government was to pay the entire cost of treating on Federal land and 25% of the cost on State and private land. The State was to pay the remaining 75% on State land from existing appropriations. The remaining 75% on private land was to be paid from the Insect and Pest Control Fund.

The State Forester was urged by the Western Forestry and Conservation Association to request an appropriation from the 1963 Legislature to pay for 25% of the cost of control on private land which would result in the private owner paying only 50% of the cost. The request was made and approved.

The Pest Control Fund (38-408 ICA) was used as an operating fund throughout the project. The almost immediate availability of this fund for insect control work makes it invaluable. It is forseeable that control work might have to be delayed for one or two years from lack of funds were this fund not available. Such delays could quadruple the final cost of any control project. The expenditures on this project were the first use of this fund. Maintenance of this fund is a must for efficient and economic pest control.

Owner and Agency Cooperation

The first step in the control project was the declaration of a Zone of Infestation as prescribed by law (Appendix, Page 7), by the State Forester. This served as a legal notice of the intent to enter upon private lands for the purpose of control and gave the State Forester legal authority to do so.

The ownership pattern of land in the infested area required that cooperation be developed and maintained between the State and the private owners. To aid in obtaining this cooperation a second meeting was held in the McCall-Donnelly High School and all Valley County landowners were invited by public notice to attend. In addition personal invitations were sent owners of land within the Zone of Infestation whose addresses could be obtained. The meeting was designed to familiarize the landowners with the insect, and to explain the necessity for control. Additional effort was made to gain owner-agency cooperation by attempting to notify each owner separately prior to entry upon his land. In several cases, owners could not be contacted immediately and it was necessary to begin control without prior notice.

Overall, owner-agency cooperation was excellent with only two complaints formally made by landowners. These complaints arose over a misunderstanding of intentions and the conditions were corrected immediately. One complaint was in regard to a merchantable log that appeared partially destroyed and the other concerned a fence that had been knocked down.

Control Methods and Procedures

Questions considered in determining control methods were:

1. Which agency would be responsible for the control project?
2. What treating methods would be used for control?
3. Should the control work be on a contract with private individuals?
4. Should the landowner be permitted to perform control work on his own land for which he would be paid in part?

Many ideas were discussed in regard to project and area responsibility for the control work. It was determined that one agency should have overall control because of the many owners and, since most of the owners were private, the responsibility fell to the State.

Five methods of treating trees infested with mountain pine beetle were considered:

1. Logging and removal of infested material to a sawmill, or treating plant.
2. Cutting and peeling infested trees.
3. Spraying infested trees with a solution of ethylene di-bromide.
4. Burning infested trees standing.
5. Burning infested trees in decks.

Most of the timber was too small for sawlogs and the scattered ownership

pattern made it difficult to obtain a coordinated logging effort. Utility and hop pole dealers were shown the quantities of pole material, but interest was limited because of the ownership pattern and the quality of the tree infested. Attempts were made to encourage use of the harvest treatment by individual owners. Cutting and peeling was dismissed as impractical on a large scale.

Spraying with ethylene di-bromide was limited by several factors: (1) It was desirable to treat infested trees during the winter months so that a good labor force would be available, and supervisory help would not be tied up during the late spring work period; (2) Question existed as to whether ethylene di-bromide can be used effectively when the bark is frozen; (3) The cost per tree of spraying with ethylene di-bromide is supposedly the most expensive method of control in many cases.

The fourth method, burning standing, was decided upon as the best method for winter treatment of the lodgepole material. There were several factors that made this method appear the most promising. These are:

1. General lower historic cost per tree as compared with other methods.
2. Availability of equipment because of diversion from other activities in off season.
3. Smaller labor force required because of longer work schedule thus less overhead.

In areas where the major species was ponderosa pine, the trees were to be burned in decks. The thicker bark of ponderosa pine would make it impractical to burn standing sucessfully. Deck burning was not considered for major application in lodgepole because it appeared that this would require a large and costly labor force. Location of infested trees could be done by the treating crew, and the trees treated as they are found, or location could be done by specially trained crews which mark the infested trees for the treating crews. The latter method was decided upon as the most efficient. Spotting the trees ahead of the spray crews permits mapping and subsequently better utilization of equipment, better deployment of treating crews, and provides a basis for checking on the effectiveness of both treating and spotting crews.

The intermingled ownership made contract control other than by landowners appear impractical. A large number of overhead personnel would have been necessary.

By permitting the landowner to undertake control (Appendix, Page 9), it was thought that these several benefits might result:

1. Owner-agency cooperation would be enhanced by giving each owner an opportunity to effect control on his land without carrying the entire expense.
2. Effect cheaper control on some areas because partial payment would increase efforts to utilize merchantable material.
3. Give the State complete check of control measures by permitting inspections on harvest operations involving infested materials.
4. Make each owner aware of the insect problem on forested lands and to acquaint him with control measures.

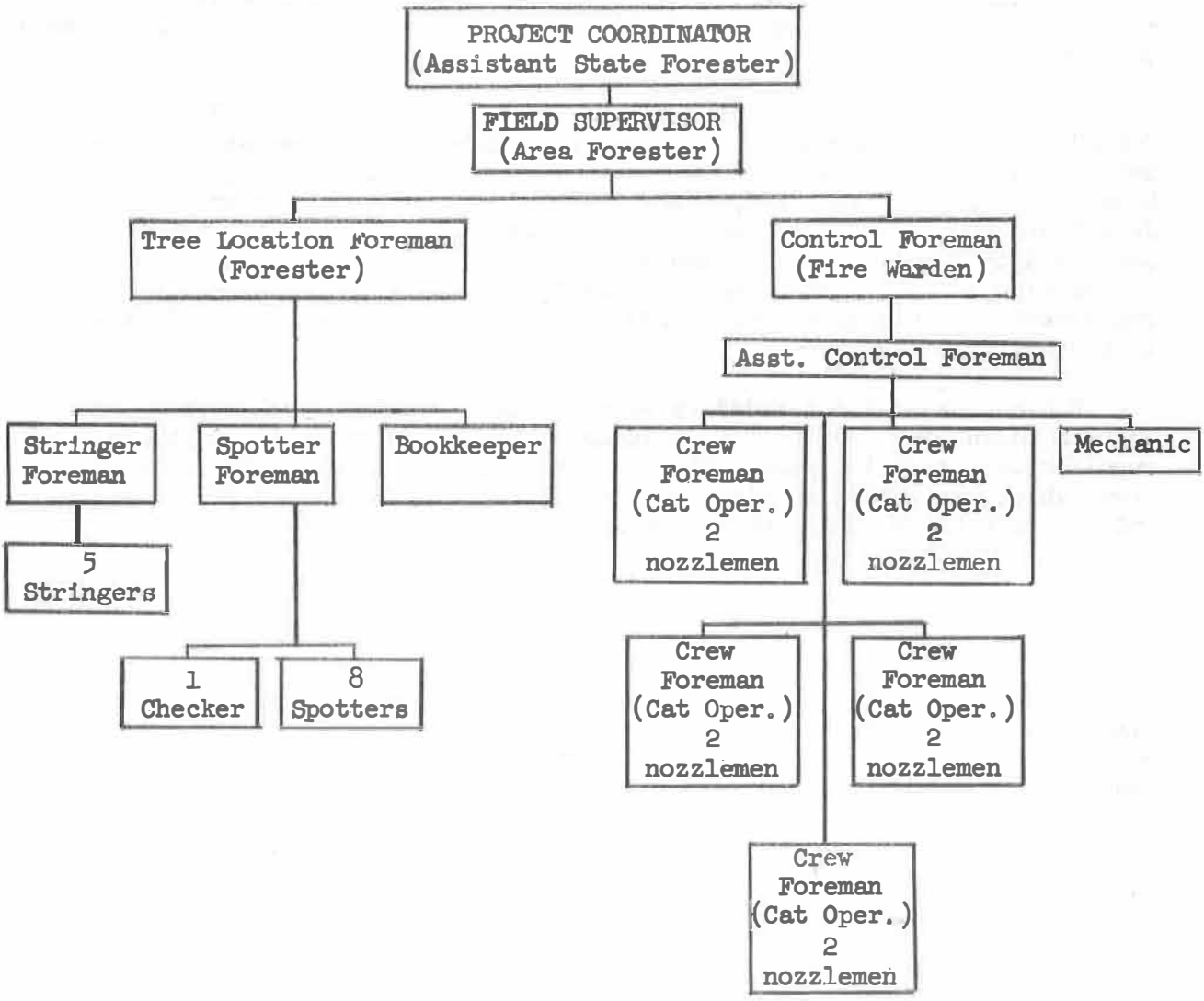
5. Gain valuable landowner contacts for the furtherance of Woodland Forestry in this area.

6. Allow study of possibilities for future owner contracted control in small epidemic areas.

One dollar per tree was offered to the owner as an inducement for him to perform control on his own land. Some savings would be brought about by this method of control. Many of the smaller and some of the larger owners indicated immediate interest, however, much of their interest subsided as the work grew nearer. Contracts were made with three owners, two of whom completed their control in a very satisfactory manner.

Organization - General

The Southwest Idaho Area was charged with the responsibility for control by the State Forester. The following is a chart of the control organization:



Manpower for the spotting and the treating crews was hired from the local labor pool and from the seasonal help of other units of the State Forestry Department. State personnel were given preference since their working capabilities were already established. Seventy applications were received in response to a brief notice in the local paper, and twenty applications were received from seasonal employees of the State. The large number of applications were received from seasonal employees of the State. The large number of applicants made selection of good men easy. Some ill feelings developed among local people as a result of importing labor from State sources. This was mainly due to high job competition in the area during the winter months. Advertising should have been withheld until it was definitely decided how many seasonal State personnel were available.

Capital equipment for the project was drawn from State fire and timber management districts. New equipment was purchased only where items were not available from stock. Most new purchases were specialized or expendable equipment. Four wheel drive vehicles were acquired where available as a hedge against snow and muddy roads. International manhauls were the basic mode of crew transport. Universal jeeps and jeep pickups were used for small crews and supervisory personnel.

The burning units consisted of one 180, four 230, and one 375-gallon tank for diesel storage mounted on two wheeled trailers. Also mounted on the trailer units were two live hose reels with 400 ft. of one half inch ID neoprene lined hose and a 10 GPM Wanner pump unit. These trailer units were pulled by 1010 John Deere and TD 340 International tractors. Three 750-gallon 6 x 6 tankers were used to supply diesel to the pump units in the field, each tanker serving two burning units. Tankers were filled in the field by the oil company supplying diesel. It was necessary to add stove oil in varying amounts to the diesel to prevent freezing.

Radio communication aided in maintaining a constant fuel supply; and in reducing down time from broken equipment. Mobile or portable radios were supplied to all field crews. They were most useful to stringer and spotter crews which were often working in isolated areas. Many field problems were solved using radio rather than traveling for personal contact.

TREE LOCATION

Procedure

The project consisted of six, presumably separate, infestations with considerable distance between each of them. Each infestation was divided into control units using roads, creeks, or ownership patterns to aid in administrative control and in the deployment of location and treating crews. Each unit was stripped at two chain intervals with the strips numbered consecutively throughout the project. The beginning of each strip was marked with a numbered aluminum tag. The strip lines were run with blue paint and even numbered lines were marked at five chain intervals with blue flagging tape to further aid in the location of infested trees. All infested trees were tagged with consecutively numbered aluminum tags, marked with an orange paint band, and located within five chain intervals (1 acre) on tally sheets using the blue flagging in the two chain wide strips as a guide. Errors in placement of markers or in

counting markers sometimes resulted in erroneous location of trees within the strip; however, this was minor compared to the time saved in treating. Field records for stripping and spotting were turned in to the bookkeeper who transferred the information to the strip sheets (Appendix, Page 10), for use by the treating crews in locating the infested trees. The bookkeeper also maintained a master list of tag numbers which had been placed on infested trees based on information supplied by spotting crew field records.

The treating crews carried the strip sheets to aid them in locating the infested trees. They removed the tag from each tree prior to treatment and turned them in to the bookkeeper each night. He checked the tag numbers against the master list of tags used. After the strips were completed the master tag list was compared to the strip sheet and missed trees were noted for rework by the crew. The tagging and strip sheet method insured almost 100% treatment of spotted trees.

Aerial photos were used to locate control unit boundaries and, in areas where trees were scattered, strips were plotted on 8"/mile aerial photo enlargements and the approximate location of infested trees were marked in the strips. By this method, treating crews could cross strips from infested tree to infested tree. This method was especially useful in the Paddy Flat area where trees were widely scattered and the terrain very rough.

Stringing

The stringer foreman was furnished with aerial photos encased in tracing film on which the units were laid out by the location foreman. String lines were assigned by the stringer foreman to each stringer. Each man was trained in pacing and compass technique and was checked constantly by the stringer foreman. From a given starting point two chain offsets were made along a road or other unit boundary and the stringers moved abreast across the unit, made offsets, and returned. An alternate method of assigning each man two or more strips was used when it seemed beneficial. By moving stringers abreast through a unit, lines were maintained at a more even distance apart; stringers were not working alone in swampy and rough areas; and the foreman could more easily supervise his men. Crew speed was stabilized through individual control.

Stringing crew equipment consisted of:

1	4 x 4 Manhaul
1	Universal Jeep (when working a split crew and for foreman use)
1	5-gallon container for paint thinner
1	Mobile or portable radio
1	Silva compass for each man
1	Nelson paint gun for each man
1	Hand axe for each man
1 pr.	Snowshoes for each man
	Map cases for quart paint cans
	Aerial photos of the work area
	Paint
	Flagging tape
	Pocket sized notebooks
	Nails

Strip tags
Tag holders

Approximately 586 miles of line was run on the project covering 9,373 acres. About 2,700 acres were spotted using natural boundaries instead of paint lines. A total of 2,175 manhours were used in stringing (including the foreman) for an average of 21.5 chains of line per manhour.

Paint was used for most "string" lines instead of string because of the expectation of heavy snow in the area and to prevent loss of the line through movement of animals and equipment. String was effectively used in some small areas where the lines were short.

String is considerably cheaper than paint. A 2 lb. ball of 4-ply string will run about 1½ miles of line at a cost of $2.02 ($1.35/mile), whereas a quart of marking paint will run about .25 mile of line at a cost of $.77/qt. or $3.08/mile. Since the lines are temporary, the paint can be thinned with 1 part thinner to 2 parts of paint. A slight increase in crew speed is gained using paint instead of string. Spotting and treating crews noted little difference in string and paint for establishing guide lines.

One variation in stringing was to run all even numbered lines in red string and all odd numbered lines in white. This combination met with full approval of the spotting and treating crews because the red string showed well against snow on bright days and the white string showed well on overcast days. It also served to keep spotters within assigned strips.

Stringer records consisted of a daily work sheet giving the name, date, area, unit, strip numbers used, direction and length of strip, paint used and hours worked. Work sheets were posted daily to strip sheets by the bookkeeper.

Spotting

Strip sheets and aerial photos were given to the spotter foreman after stringing was completed in each unit. Each spotter was assigned two strips by the spotter foreman in which to check each tree for pine beetle infestation. This enabled the spotter to work both ways, fully utilizing walking time.

Spotters indications of infested trees were pitch flow from entrance holes, frass, woodpecker activity, and general tree condition. Conclusive evidence that a tree required treatment was presence of pine beetle larvae under the bark.

Each spotter was trained for two weeks under the close supervision of the location or the spotter foreman. He was then checked closely until he became adept at locating infested trees. Throughout the project, all strips having more than 1 tree per acre were checked for missed trees and, if necessary, reworked. Where possible, rework was done by the individual who first worked the strip to permit him to see his own errors.

The spotter took mental note of the 5 chain marker flags on the even numbered lines as he proceeded up the strip, working between lines and checking all trees in the strip. Infested trees were marked with a 1" orange paint band and a metal tag was nailed to the tree. In areas where the infested trees were

widely scattered they were marked with wider bands to assist in location by the treating crews. The first and last tag numbers in a group were recorded with the strip number and location within the strip.

Spotting crew equipment consisted of:

1	4 x 4 Manhaul
1	4 x 4 Universal Jeep
1	Hand Axe for each man
1	Compass (helpful but not necessary) for each man
1	Map case or nail apron to carry pressurized paint for each man
1 pr.	Snowshoes for each man
1	Pocket notebook for each man
	Nails
	Tree tags
	Tag holders

Each spotter turned in a daily work record to the bookkeeper for posting to the master number list and to the strip sheets.

Location statistics were as follows:

Total trees spotted	13,756
Total acres spotted	12,147

Average length of strip spotted/manhour	14.4 chains
Average number of acres spotted/manhour	2.89 acres
Average number of trees spotted/manhour (Infestation intensity 1.1 trees/A)	3.2 trees

Total tree location cost for the project was 21,731.49. Project location costs were $1.61 per tree and $2.12 per acre. The costs per tree in the Paddy Flat area were higher ($5.66 per tree and $1.20 per acre), because of rough terrain and dispersion.

This includes 7 mandays and 100 vehicle miles on intensive survey in the Lower Big Creek area. To determine if need for control existed, one-quarter-chain wide linear samples were taken at 10 chain intervals. Strip width was measured at all points where trees were counted and all infested trees were checked for larval content prior to counting. Permanent sample plots were set up by marking the strip center-line with red paint to expedite future tracking of the infestation in this area. Results of the survey showed 1.79 red tops per acre and 1.73 live infested trees per acre. Control was not considered immediately necessary even though the area was originally included in the project. Most of the infestation is confined to the lower vigor and lower quality trees in the young ponderosa pine stands. Continued spot checking of the Big Creek area is planned.

TREATING

Treatment by State Crews

Six State supervised control crews were planned but only five were organized

because the spotting crews were unable to get ahead of the treating crews. Early location work indicated that a sizeable underrun was eminent in the number of trees requiring treatment. As cold weather developed it became impossible for the control foreman to organize and assign work, maintain quality in treatment and to also supervise the necessary equipment repairs. An assistant control foreman was hired to assist in the deployment of the control crews and to check their work in the field. One serviceman was hired to do minor repairs and maintenance for all units. This proved satisfactory.

Tractor operators were designated as crew leaders and were responsible for all treating crew work. The usual procedure was to assign two or three crews to a unit, separating the crews by about 10 strips. Separation was necessary so that crews could have separate strip sheets which covered several strips each. Separation also helped to establish responsibility for the work in a given area while keeping the two crews close enough to use the same diesel tanker and transportation. By using strip sheets, the crew leader could locate all trees in his assigned strips with a minimum of travel time between trees. The control foreman and assistant control foreman provided a continual check on the quantity and quality of crew work. Each crew leader submitted a daily work report (Appendix, Page 12), and turned in all tags from treated trees which were checked off the master list of tag numbers.

Lodgepole Pine

Lodgepole pine was burned in a standing position. Where the tree could not be burned to a sufficient height, it was felled so the entire stem could be reached. Two Bean nozzles and shop built igniters were supplied to each trailer unit. The pump pressure was held between 200 and 300 lbs. at 500 to 600 RPM to obtain maximum height with the flame. At higher pressures the stream of diesel did not ignite well. Bean nozzles were used with a number 5 orifice. This allowed approximately 2.7 gallons per minute to pass through the nozzle. The igniter consisted of 1 inch copper tubing necked down with a 3/4 inch elbow and 1 3/4 inch fire pot. The igniter contained an asbestos wick and a small reservoir for diesel. The control foreman constructed the igniters for $8.00 each, including labor. This arrangement allowed two nozzlemen to burn at one time but in areas where trees were scattered only one nozzleman was used on the crew.

The initial training of crew leaders on the technique of burning standing was provided by the U. S. Forest Service personnel. The flame was directed at the base of the tree for approximately one-half minute and then gradually moved up the tree. Trees were burned for approximately two minutes or until a white ash was formed on the outer edges of bark plates. A longer period of burning was required at the base than on other portions of the tree due to thicker bark and initial heating of the tree.

The trees were burned first on one side and then on the other. This was supposedly not necessary as the flame raps itself around the tree and is hotter on the far side of the tree. The two side burning was decided upon as insurance for success since the lodgepole pine in the McCall area have thicker bark than the high elevation trees on which burning had been tried previously.

An average of 2.6 trees were burned per manhour by this method but there was a large variation in production depending upon the density of the infested

trees, terrain, and the size of the trees. The average wage per man for the three man crew was $1.88 per hour.

Treating cost figures for an optimum situation were as follows:

Salaries and wages	$ .72 per tree
Tractor cost (14.3 trees/hr.)	.23 per tree
Diesel (5.5 gallons/tree)	.74 per tree
	$ 1.69 per tree

The above costs were compiled during February when crews were well trained and organized and provided better comparison with areas treated by piling and burning. The costs are not representative of average work or production for the entire project.

Basic equipment for this type of control was:

1	Manhaul per two crews
1	750-gallon 6 x 6 tank truck per two crews
1	Tractor and trailer unit with 180 - 230 gallon tank and pump
2	Bean nozzles with igniters attached
1 set	Mechanics tools
1	Gas container for chain saw
1	Chain saw
1	Ax
2	Face Shields
1	Map case for removed tags
3	Hard hats
3	Rubberized coats for protection from falling sparks

Ponderosa pine

The method of treating in stands of young ponderosa pine was burning-decks. When considering trees of the same size, this method was more expensive but gave much more positive control. Trees were felled and hand piled or skidded together by tractor and burned completely. Four-man crews were used in this operation: 1 tractor operator, 1 sawyer, 1 fire tender, and 1 man working with the tractor. By the time this method of treatment was started, the stringing and spotting crews were converted to control and supplied the fourth man in each crew.

In the East McCall area (Hubbard Area), trees were comparable in size and average density per acre to most of the lodgepole on other areas but were more closely grouped. Averages for this area were: 1.53 trees per manhour at an average cost of $1.86 per manhour.

Average treating cost figures for this type of treatment were as follows:

Salaries and Wages	$ 1.22 per tree
Tractor cost ($5.38 tree/hr.)	.62 per tree
Diesel (1.02 gallons/tree)	.14 per tree
	$ 1.98 per tree

In the Brown area, where the trees were small and densely grouped ponderosa pine, 1.68 trees were treated per manhour.

Salaries and Wages	$ 1.11 per tree
Tractor cost ($6.94 trees/hr.)	.09 per tree
Diesel (.32 gallons per tree)	.04 per tree
	$ 1.24 per tree

One of the prime factors for the low cost per tree in the Brown area was the number of the infested trees and their small size, (3-8 inches DBH). In many spots the infested trees were nearly 100% of the stand.

The following is a comparison of the cost per tree of field expenses, under optimum conditions, for each of the three variations of treatment mentioned:

Standing burning		$ 1.69 per tree
Deck burning	Hubbard Area	$ 1.98 per tree
Deck burning	Brown Area	$ 1.24 per tree

Overall, the State crews treated a total of 12,911 trees on a total of 10,904 acres, averaging 1.01 trees per manhour. This figure is less favorable than that of the above area comparisons which show only the field labor expended by trained crews.

The total cost of treating for the project was $42,184.67. Treating costs for the project on areas treated by State crews were $3.12 per tree and $4.14 per acre. Costs per tree for treating in Paddy Flat were $10.98 per tree and $2.33 per acre. The higher cost for Paddy Flat was due to the steep terrain, low intensity of infestation, and distance from the base of operations.

Treatment by Private Landowners

Contracts for control were made with three landowners involving 976 trees on 1,023 acres. The cost of control to State by this method are as follows:

Area	Acres	Trees	Spotting Cost	Project Treating Cost	Total Cost
Boise Cascade *	890	620	$ 1,103.60	$ 458.00	$ 1,561.60
C. C. McGinnis	93	293	521.54	293.00	841.54
C. Watson	40	63	112.14	Contract Forfeited	112.14
TOTAL	1,023	976	$ 1,737.28	$ 751.00	$ 2,488.28

* It was considered unnecessary to treat all trees marked on this area. Trees easily accessible and in groups of four or above were treated for a total of 458 trees.

Spotting costs in the above table are based on the average cost per tree for the entire project.

The actual cost to the landowners was considerably in excess of the $1.00 per tree payment. The data for the following table was given by the contracting owners.

	Boise Cascade	McGinnis	Watson (Blenkinsop)	Total
Total manhours expended	401	150	Contract Forfeited	551
Fair wage rate	$ 2.25/hr.	$2.00/hr.		N/A
Vehicle charges	$ 51.60	$ 84.00		$ 135.60
Equipment charges	$ 235.50	$ 437.50		$ 673.00
Fuel or chemical cost	$ 245.80	$ 45.00		$ 290.80
Supervision	$ 144.00	N/A		None
Additional charges	None	None		None
Value of products	None	$ 50.00		$ 50.00
Additional values	None	None		None
Total expenses	$ 1,579.15	$ 886.50	-	$ 2,465.65
Total receipts	$ 458.00	$ 343.00	-	$ 801.00
Net Cost to owner	$ 1,121.15	$ 543.50	-	$ 1,664.65

Treatment methods varied on each of the three contracted areas. Boise Cascade Corporation treated all trees that could be reached easily by burning standing. A pickup truck was used to haul a diesel tank with a pump and hose reel. The hose was pulled to all trees within ten chains of the one main road through the area. Scattered trees in groups of four or more were treated by spraying Ethylene di-bromide from stirrup pumps on the infested trees. The chemical, oil and pumps were backpacked to each tree.

C. C. McGinnis treated trees on his land by cutting, piling all branches and litter in the area, and charring the infested trees in post lengths on the burning piles.

William Blenkinsop began treating by hand peeling all post and pole material, but forfeited his contract.

Treatment was satisfactory on the two completed areas. It should be noted that treatment on these areas was initiated as a cooperative effort rather than as a money-making venture. This type of effort by private industry is highly commendable.

RECOMMENDATIONS

Survey

Future surveys should be planned sufficiently far in advance to provide

time for an accurate survey. Prior to any actual ground work, the area should be flown and mapped carefully by the person in charge of the survey. Sampling should be done carefully with respect to width of strip and presence of larval broods in counted trees. Counting pitchouts or trees outside sample strips can lead to over-estimation of the number of infested trees. Width of strip should be checked by carrying a stick to extend the arm reach to 8 1/4 feet. Larval content should be checked by actually chopping into the tree unless the survey personnel are currently familiar with the insect. Strip length can be checked by plotting on a large scale map or aerial photo. Any or all of the above listed factors may have been responsible for the poor accuracy of the pre-control survey for this project. The part of the survey completed by trained U. S. Forest Service personnel was highly accurate.

Aerial surveys followed by ground checks should be made on the McCall Project for at least the two following years. Of particular importance is the area southeast of the Elmer Brown property, and the area south of Cascade in the lower Big Creek drainage.

Stringing and Spotting

The optimum crew size for stringers appeared to be five stringers and one stringer foreman. A smaller crew did not fully utilize the vehicle or the foremans time. Moving the stringers abreast through a unit seemed to be the most efficient and easily controlled method.

Lines should be painted where heavy snowfall is expected. Blue and orange paint show well while red is difficult to see in shadows. Where heavy snowfall is not likely, lines should alternate white and red string.

The optimum strip width is apparently 2 chains with reduction to 1 chain in heavily infested areas (15-20 trees/acre). Wider strips, even in sparse timber, resulted in considerable lost time by spotting and treating crews.

Approximately 2,700 acres of this project were spotted by meandering between natural boundaries. Very little, if any, gains were made by this method. Spotting took longer and was less accurate, and treating crews had difficulty in locating trees for treatment.

Spotters should be cautioned often against writing down the wrong tree tag number. Probably the most frequently occurring spotter error was to write down the next number to be used from the clip instead of the last number used.

Control

Owner: Where the infested area is made up of intermingled private ownerships as in the McCall project, contract control by the landowner could be very helpful. However, a great deal of effort must be put into screening contractors, raising interest of the owners and supervising the work of the contractors. Personnel in addition to the numbers and positions used on the McCall project would be needed. The screening efforts should be directed toward the elimination of the undependable and the encouragement of the dependable operators.

One trained forester should be assigned to owner control on any project of 10,000 or more trees. This forester could also encourage the utilization of material produced by the owner in the form of small products such as hop poles, utility poles, corral poles, and posts. As more cost data is developed on control projects, the amount offered to the landowner possibly could be raised from the $1.00 offered on the McCall project. A larger payment would induce greater participation by owners.

The first item of importance in this form of control is to develop an organization by supplying sufficient personnel for owner control. The second is that costs incurred in owner control exceed the inducement payment.

State: The stringing and spotting technique, used on the McCall Bug Project, made the control portion very easy. All the control crew had to do was look on the strip sheets, read the location of infested trees and go to them. One addition that would help to locate trees faster, would be to flag the tree as well as band it with paint. Some of the paint used would blend into the bark making it very difficult to find.

In organizing the control crews, it would be better to pick local men as crew leaders and tractor operators. They seemed to take more interest in finding all the trees for treatment.

Small crawler tractors pulling trailer mounted tanks, pumps and hose, works very good until you get into steep frozen or snow-covered ground. It would then be better to have the equipment mounted on the tractor. Several breakdowns were caused by the trailer jackknifing while going down hill, damaging pumps, hose reels, or trailers or tearing the tank loose from the trailer. Here again, a local man would be better than an outsider for he would know the country in which he is working.

Where the infestation is scattered instead of grouped, a control crew consisting of one tractor operator, and one nozzleman would be sufficient. They can do as much work as a three man crew, saving the wages of the third man.

In the pile and burn method of treating, a five man crew consisting of tractor operator, sawyer, 2 axe men, and 1 choker setter, is sufficient. One extra man per two crews could be utilized to keep the piles burning, and to assure total burning.

APPENDIX

PROJECT PERSONNEL

OVERHEAD ONLY

Project Coordinator	William A. Scribner, Assistant State Forester
Field Supervisor	Ray A. Miller, Area Forester
Location Foreman	Doyle M. Romans, Forester
Control Foreman	E. J. O'Daniel, Forest Warden
Assistant Control Foreman	Guy Beam, Hazard Reduction Foreman

TREES TREATED BY OWNERSHIP AND AREA

AREA	FEDERAL		STATE		PRIVATE		TOTAL	TOTAL
	Acres	Trees	Acres	Trees	Acres	Trees	Acres	Trees
Paddy Flat	1,480	315	0	0	440	93	1,920	408
Donnelly	110	31	0	0	659	313	769	344
McCall	70	105	250	185	7,508	9,711	7,828	10,001
Gold Fork	0	0	40	28	1,590	3,153	1,630	3,181
TOTAL	1,660	451	290	213	10,197	13,270	12,147	13,934

PROJECT COSTS

BY AREA and FUNCTION

	PADDY FLAT	OTHER	TOTAL
TREE LOCATION	$ 2,307.97	$ 21,731.49	$ 24,039.46
TREATMENT	4,480.18	42,184.67	46,664.85
	$ 6,788.15	$ 63,916.16	$ 70,704.31

DISTRIBUTION OF PROJECT COSTS BY FUND

Treatment of Federal trees	$ 5,884.88
Federal 25% share of State & Private trees	$ 16,204.86
State 25% share of Private trees	$ 15,952.98
State 75% share of State trees	$ 755.61
Private Owners share (FI & IC Fund)	$ 31,905.98
Total Project Cost	$ 70,704.31

TABULATION OF PROJECT COSTS BY FUNCTION

SALARIES AND WAGES		
Administration:		
Doyle Romans as payrolled Dec. 1962 thru April 1963	$ 2,573.71	
Ray Miller @ $555/month, Dec. 1962 thru April 1963	2,497.78	
	$ 5,071.49	
Payroll Overhead (18.815%)	954.20	
		$ 6,025.69
Field:		
Miscellaneous Payrolls	$ 40,785.43	
Less Non Qualifying S & W (Miller, Anderson, Atkinson, Bateman)	5,473.45	
	$ 35,311.98	
Payroll Overhead (5.635%)	1,989.83	
		$ 37,301.81
TOTAL SALARIES & WAGES:		$ 43,327.50
OTHER CURRENT EXPENSE		
Travel	$ 1,143.20	
Miscellaneous Purchase (Fuel, Oil, Small Tools, etc.)	26,133.79	
Less Payroll Overhead included in S & W	1,631.67	
TOTAL O. C. E.:		$ 25,645.32
CAPITAL OUTLAY		
Purchase Large Equipment Items	$ 4,427.62	
TOTAL C. O.:		$ 4,427.62
		$ 73,400.44
BOISE OFFICE ADMINISTRATION CHARGE (2%)		$ 1,468.00
		$ 74,868.44
Less Residual Value of equipment acquired for project.		$ 4,164.13
NET COST OF PROJECT:		$ 70,704.31

COST COMPUTATION ON A PER TREE BASIS

PADDY FLAT
315 Federal Trees
93 Private Trees

TOTAL PROJECT COST	$ 70,704.31
Unassignable Project Costs	13,078.78
TOTAL ASSIGNABLE COST	$ 57,625.53
Assignable Cost Allocated to Paddy Flat (See attached schedule) (9.60% of Total Assignable Cost)	$ 5,532.62
Unassignable Cost Allocated to Paddy Flat (9.60% of Total Unassignable Cost)	$ 1,255.56
TOTAL COST FOR TREATING 408 TREES	$ 6,788.15
COST PER TREE	$ 16.64
COST OF TREATING 315 FEDERAL TREES @ $16.64 PER TREE	$ 5,241.60

OTHER AREAS
13,526 Trees Total
136 Federal Trees

TOTAL PROJECT COST	$ 70,704.31
Less Paddy Flat Cost	$ 6,788.15
COST OF TREATING OTHER AREAS	$ 63,916.16
COST PER TREE	$ 4.73
COST TREATING 136 FEDERAL TREES	$ 643.88

COSTS DIRECTLY ASSIGNED TO PADDY FLAT

TREE TREATING COSTS IN PADDY FLAT:

Labor:

40 hours @ $1.65/hour - Bookkeeper	$ 66.00	
60 hours @ $2.30/hour - Foreman	138.00	
308 hours @ $2.05/hour - Cat Operator	631.40	
49.5 hours @ $2.15/hour - Service Man	106.43	
248 hours @ $1.80/hour - Nozzleman	446.40	
	$ 1,388.23	
Added Cost of temporary employee (5.635%)	78.20	
Per diem one man ½ month @ $106/month	26.50	
Total Salaries & Wages:	$ 1,492.93	$ 1,492.93

Vehicles:

6 round trips (40 miles)	$.35/mile - 6x6	$ 84.00	
34 round trips	$.10/mile - 4x4 PU	136.00	
8 round trips	$.12/mile - 4x4 Manhaul	38.40	
9 round trips	$.12/mile - 4x4 Manhaul	44.80	
Total Vehicle Cost:		$ 303.20	$ 303.20

Tractor Rental:

CT-2 15 days @ $20/day	$ 300.00	
CT-9 15 days @ $20/day	300.00	
R-4 22 hours @ $5/hr.	110.00	
D-6 w/oper. 8 hrs. @ $13.65/hr.	109.22	
Total Tractor Rental:	$ 819.22	$ 819.22

Fuel: (burning)

2901 gal. @ $.1348/gal.	$ 391.05	$ 391.05

TOTAL TREATING COST: $ 2,006.40

(COSTS DIRECTLY ASSIGNED TO PADDY FLAT Cont'd)

TREE LOCATION COSTS IN PADDY FLAT:

Labor:

386 hours @ $1.80/hr -) Bookkeeper Stringers 595 hours @ $1.65/hr) Spotters	$ 694.80 981.75		
Total:	$ 1,676.55		
Added cost of temporary employee (5.635%)	94.47		
Total Salaries & Wages:	$ 1,771.02	$ 1,771.02	

Vehicles:

15 round trips (40 miles) $.10/mile - Jeep 16 round trips $.12/mile - 4x4 Manhaul	$ 60.00 76.80	
Total Vehicle Cost:	$ 136.80	$ 136.80

Paint:

271 quarts of blue paint @ $.77/qt. 21 cans of orange paint @ $.76/can	$ 208.67 15.96	
Total Paint Cost:	$ 244.63	$ 244.63

Supervision:

1 man ½ month @ $545/month	$ 272.50	
Added cost (18.815%)	51.27	
Per diem ½ month @ $100/month	50.00	
Total Supervision:	$ 373.77	$ 373.77

TOTAL SPOTTING COST: $ 2,526.22

TOTAL ASSIGNED COST $ 5,532.62

PAYROLL OVERHEAD COMPUTATION

Payroll Overhead For Permanent Employees

Social Security	3.625% of Base Wage
Unemployment Insurance	.9 %
Life Insurance	3.18 %
Workmans Compensation	1.11 %
	8.815% of Base Wage

Annual Leave - 12 days/year

Sick Leave - 10 days/year (assume 4/5 used)

Holidays - 6 days/year

Total - 26 days/year ÷ 260 days/year =	10.0000% of Base Wage
Gross cost per man = Base wage +	18.815%

Payroll Overhead For Temporary Employees

Social Security	3.625% of Base Wage
Unemployment Insurance	.9 %
Workmans Compensation	1.11 %
	5.635% of Base Wage

STATE OF IDAHO
DEPARTMENT OF FORESTRY
BOISE, IDAHO

DECLARATION OF ZONE OF INFESTATION
MOUNTAIN PINE BEETLE
VALLEY COUNTY, IDAHO

WHEREAS, the population of the Mountain Pine Beetle which kills lodgepole pine and ponderosa pine has increased to epidemic proportions in parts of Valley County, Idaho, and

WHEREAS, valuable timber lands and recreation areas are threatened, and

WHEREAS, control of this infestation is practical and necessary and funds are available for such control,

NOW THEREFORE, I, Roger L. Guernsey, State Forester, by authority vested in me by Section 38-602 Idaho Code, and with the approval of the State Board of Land Commissioners, do declare a ZONE OF INFESTATION OF MOUNTAIN PINE BEETLE, said zone being described as follows:

All portions of the following listed Townships lying wholly or in part in Valley County, Idaho, to wit:

Township 13 North, Ranges 2, 3 and 4 East BM

Township 14 North, Ranges 2, 3 and 4 East BM

Township 15 North, Ranges 2, 3 and 4 East BM

Township 16 North, Ranges 2, 3 and 4 East BM

Township 17 North, Ranges 2, 3 and 4 East BM

Township 18 North, Ranges 2, 3 and 4 East BM

Township 19 North, Ranges 2, 3 and 4 East BM

Done this 26th day of November, 1962
at Boise, Idaho.

/s/ Roger L. Guernsey
Roger L. Guernsey, State Forester

ATTEST:

/s/ William A. Scribner
William A. Scribner, Assist. State Forester

A G R E E M E N T

WHEREAS, the State of Idaho, acting through the State Forester, is desirous and obligated to effect control of a Mountain Pine Beetle infestation in Valley County, Idaho, and

WHEREAS, it is deemed that the most economical method of control can be affected by individual effort of private landowners under supervision of the State, and

WHEREAS, certain costs will be incurred by the private landowners carrying out control of the beetle infestation on their lands, and

WHEREAS, such control by private landowners is beneficial to the State of Idaho,

NOW THEREFORE, the State Forester hereinafter referred to as the Party of the First Part and _____ of _____, _____ hereinafter referred to as the Party of the Second Part do hereby agree to the following terms:

The Party of the First Part:

1. Agrees to provide instruction and technical supervision for all control activities.
2. Agrees to mark and tag all trees requiring treatment.
3. Agrees to pay the party of the second part at the rate of $1.00 per tree for all trees treated for which tags are returned.

The Party of the Second Part:

1. Agrees to effect control of the Mountain Pine Beetle on the following described tracts:

2. Agrees to locate all exterior boundaries of the above area.
3. Agrees to use one or more of the following methods of control:
   a. Logging and removal of all infested material to a sawmill.
   b. Cutting and peeling all infested trees prior to removal from area of infestation.
   c. Burning all infested trees standing or in decks.
   d. Spraying all infested trees with an approved solution of Ethylene Di-bromide.
4. Agrees to carry out all control measures under standards of the State Forestry Department.
5. Agrees to complete the entire control operation on or before April 15, 1963.

Failure of the party of the second part to carry out control measures as provided above render this agreement null and void.

Party of the First Part:

ROGER L. GUERNSEY
State Forester
by_____

Party of the Second Part:

_____

_____

Witness: _____

SPOTTERS FIELD SHEET

LOCATION: Scho. N. of Road Junction Near S¼ Cor. of Sec. 24, T8N R.2E PHOTO # DH2-2P-159
STRIP IS SOUTH OF TAG

McC Alt UNIT 1

STRINGER # DATE BM-DR	STRIP #	BRG	LENGTH OF STRIP	SPOTTER # DATE	TREES SPOTTED	LOCATION OF TREES IN STRIP	CHK BY	TREES SPOTTED
11-29	5	W	24½	L & GC 11-29	2-3	5-10	12-1 DMR	(CHANGED #2)
		TOTAL TREES = 2					Completed	
BM-DR 11-29	6	E	31½	L & GC 11-29	4-29	5-15	12-1 DMR	212-216
		TOTAL TREES - 31					Completed	
BM-DR 11-29	7	W	38	L & GC. 11-29	30-130	5-25	12-1 DMR	220 & 1/2 ORANGE FLAG
		TOTAL TREES = 103					Completed	
BM-DR 11-29	8	E	51½	L & G C. 11-30	131-202	5-50	PART DMR 12-1	258-269 293-300
				PART REWORKED RT 12-3	301-307		1/2 ORANGE FLAG	Completed
		TOTAL TREES = 100						
BM-DR 11-29	9	W	54	L & G.C. 11-30	203-311	5-50	BM 12-6	1101-1123
				REWORK	217-257 822-823			
				BB-12-4 REWORK	825-834 271-272	1	100%	
				K.H. 12-5 REWORK	274-275 632-636			
TOTAL TREES = 98				RT # BM 12-7	1011-1013, 1124			
BM-DR 11-29	10	E	60	K.H 12-5	277-292 461-423	THROUGHOUT STRIP	R.T. 12-5	538-542 544-552
		TOTAL TREES = 53					finished	

NOTE: TAG # 273 REMOVED - DEAD TREE
TAG # 276 REMOVED - DEAD TREE
TAG # 543 - LOST

6 CANS BLUE PAINT, 18 ORANGE PRESS.

CREW LEADER DAILY REPORT

CREW _____ HOURS WORKED

_____ _____

_____ _____

_____ _____

_____ _____

STRIP NUMBERS

_____

TREES TREATED TODAY TAGGED _____

UNTAGGED _____

TOTAL TREES _____

TOTAL GALLONS FUEL USED _____

AVERAGE NUMBER OF GALLONS PER TREE _____

PROBLEMS, NEEDED REPAIRS, ETC.

_____ _____

DATE CREW LEADER SIGNATURE